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**meap**<sup>TM</sup>  
Michigan Educational Assessment Program

# *Item Descriptors*



***MATHEMATICS***  
***FALL 2013***

**MICHIGAN STATE BOARD OF EDUCATION**  
**STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW**

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***NOTE: For each item listed throughout this booklet, the first statement is a summary of the Michigan Grade Level Content Expectation (GLCE) and the second statement is the descriptor for the item's stem or question.***

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Students were instructed to read the directions below silently as the test administrator read them aloud.

## PART 1

### DIRECTIONS:

In this part, you will answer multiple-choice mathematics questions. Some questions will ask you to view a picture, chart, or other mathematics-related information. Use that information with what you know to answer the question. You may **NOT** use a calculator for this part of the test.

You must mark all of your answers in Part 1 of your **Answer Document** with a No. 2 pencil. You may underline, circle, or write in this test booklet to help you, but nothing marked in this test booklet will be scored. No additional paper may be used.

Mark only one answer for each question. Completely fill in the corresponding circle on your **Answer Document**. If you erase an answer, be sure to erase completely. Remember that if you skip a question in the test booklet, you need to skip the answer space for that question on the **Answer Document**. If you are not sure of an answer, mark your **best** choice.

A sample question is provided for you below.

### Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the **least** number of cases that Marty will need to hold all his CDs?

- A** 8
- B** 9
- C** 10
- D** 11

For this sample question, the correct answer is **C**. Circle **C** is filled in for the sample question on your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page. If you finish early, you may go back and check your work in Part 1 of the test **ONLY**. Check to make sure that you have answered every question. Do **NOT** look at any other part of the test.

NOTE: The directions for Part 2 are the same as the above instructions, but with calculators allowed.

- 1 N.MR.06.01:** Understand division of fractions as the inverse of multiplication, e.g., if  $\frac{4}{5}$  divided by  $\frac{2}{3} = \text{box}$ , then  $\frac{2}{3} \text{ times box} = \frac{4}{5}$ , so  $\text{box} = \frac{4}{5} \text{ times } \frac{3}{2} = \frac{12}{10}$ .

Identify multiplication equation that corresponds to given division equation.

- A** correct
- B** addition equation
- C** subtraction equation
- D**  $\text{divisor} \div \text{quotient} = \text{dividend}$

- 2 N.MR.06.01:** Understand division of fractions as the inverse of multiplication, e.g., if  $\frac{4}{5}$  divided by  $\frac{2}{3} = \text{box}$ , then  $\frac{2}{3} \text{ times box} = \frac{4}{5}$ , so  $\text{box} = \frac{4}{5} \text{ times } \frac{3}{2} = \frac{12}{10}$ .

Identify corresponding multiplication equation given division equation.

- A**  $\text{dividend} = \text{divisor} \div \text{quotient}$
- B**  $\text{dividend} = \text{quotient} \times \text{reciprocal of divisor}$
- C**  $\text{dividend} = \text{reciprocal of divisor} \div \text{quotient}$
- D** correct

- 3 N.FL.06.02:** Given an applied situation involving dividing fractions, write a mathematical statement to represent the situation.

Translate text into division expression with fractions.

- A**  $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{c}{d}$
- B**  $\frac{a}{b} \div \frac{c}{d} = \frac{b}{a} \div \frac{d}{c}$
- C**  $\frac{a}{b} \div \frac{c}{d} = \frac{b}{a} \times \frac{d}{c}$
- D** correct

- 4 N.FL.06.12:** Calculate part of a number given the percentage and the number.

Calculate percentage of number.

- A** correct
- B**  $ab\% \text{ of } cd = ab$
- C**  $ab\% \text{ of } cd = cd - ab$
- D**  $ab\% \text{ of } cd = (ab\% \text{ of } cd) + cd$

- 5 N.ME.06.18:** Understand that rational numbers are quotients of integers (non-zero denominators), e.g., a rational number is either a fraction or a negative fraction.

Identify fraction as a rational number.

- A** correct
- B** incorrect type of number
- C** incorrect type of number
- D** incorrect type of number

- 6 N.ME.06.20:** Know that the absolute value of a number is the value of the number, ignoring the sign; or is the distance of the number from 0.

Find the absolute value of a given number.

- A** given number
- B** not the absolute value
- C** correct
- D** twice the absolute value

- 7 N.FL.06.02:** Given an applied situation involving dividing fractions, write a mathematical statement to represent the situation.

Identify expression that corresponds to given context.

- A** multiplied instead of divided
- B** correct
- C** added instead of divided
- D** subtracted instead of divided

- 8 N.FL.06.04:** Multiply and divide any two fractions, including mixed numbers, fluently.

Divide mixed numbers.

- A** incorrect improper fraction
- B** incorrect improper fraction
- C** multiplied numerators, added denominators
- D** correct

- 9 N.ME.06.19:** Understand that 0 is an integer that is neither negative nor positive.

Identify negative integers.

- A** incorrect number of negative integers
- B** correct
- C** incorrect number of negative integers
- D** incorrect number of negative integers

- 10 N.FL.06.12:** Calculate part of a number given the percentage and the number.

Calculate percentage of a whole number.

- A**  $a\% = a0\%$
- B** correct
- C** divided whole number by  $a$
- D** divided whole number by  $10a$

- 11 N.FL.06.10:** Add, subtract, multiply and divide positive rational numbers fluently.

Divide decimal in hundredths by decimal in tenths.

- A** under by factor of 100
- B** under by factor of 10
- C** correct
- D** over by factor of 10

- 12 N.ME.06.17:** Locate negative rational numbers (including integers) on the number line; know that numbers and their negatives add to 0, and are on opposite sides and at equal distance from 0 on a number line.

Determine number that is the additive inverse of number represented on number line.

- A** under by 7
- B** number represented on number line
- C** correct
- D** over by 1

- 13 N.FL.06.12:** Calculate part of a number given the percentage and the number.

Calculate the percentage of a number.

- A**  $a0\% = a\%$
- B** correct
- C**  $a0\% = a00\%$
- D**  $a0\% = a,000\%$

- 14 N.FL.06.10:** Add, subtract, multiply and divide positive rational numbers fluently.

Add mixed number to fraction.

- A** added whole number to product of fractions
- B** added numerators, multiplied denominators
- C** added numerators and denominators
- D** correct

- 15 N.FL.06.12:** Calculate part of a number given the percentage and the number.

Calculate percentage of a whole number.

- A** correct
- B**  $a\% = 0.a$
- C**  $bc/a$
- D** divided instead of multiplied

- 16 N.ME.06.19:** Understand that 0 is an integer that is neither negative nor positive.

Identify characteristics of the number zero.

- A** not a characteristic
- B** not a characteristic
- C** correct
- D** not a characteristic

- 17 N.FL.06.02:** Given an applied situation involving dividing fractions, write a mathematical statement to represent the situation.

Identify division of fractions as appropriate operation given context.

- A** subtraction
- B** addition
- C** correct
- D** multiplication

- 18 N.MR.06.03:** Solve for the unknown in equations such as:  $1/4$  divided by box = 1,  $3/4$  divided by box =  $1/4$ , and  $1/2 = 1$  times box.

Calculate dividend in number sentence with fractions.

- A** correct
- B** subtracted numerator and denominators of divisor from quotient
- C** reciprocal of divisor
- D** reciprocal

- 19 N.MR.06.01:** Understand division of fractions as the inverse of multiplication, e.g., if  $4/5$  divided by  $2/3 = \text{box}$ , then  $2/3$  times box =  $4/5$ , so box =  $4/5$  times  $3/2 = 12/10$ .

Multiply two fractions.

- A** added numerators, multiplied denominators
- B** correct
- C** multiplied numerators, added denominators
- D**  $a/b \times c/d = (a \times d)/(b \times c)$

- 20 N.ME.06.17:** Locate negative rational numbers (including integers) on the number line; know that numbers and their negatives add to 0, and are on opposite sides and at equal distance from 0 on a number line.

Solve for variable in linear equation.

- A** correct
- B** reciprocal
- C** given constant
- D** additive identity

- 21 A.FO.06.03:** Use letters, with units, to represent quantities in a variety of contexts, e.g., y lbs., k minutes, x cookies.

Translate text into algebraic expression.

- A** correct
- B** subtracted instead of multiplied
- C** added instead of multiplied
- D** divided instead of multiplied

- 22 A.FO.06.11:** Relate simple linear equations with integer coefficients, e.g.,  $3x = 8$  or  $x + 5 = 10$ , to particular contexts and solve.

Select multiplication equation given context.

- A**  $ax = b$  means  $ab = x$
- B**  $ax = b$  means  $bx = a$
- C** correct
- D**  $ax = b$  means  $a + b = x$

- 23 A.FO.06.04:** Distinguish between an algebraic expression and an equation.

Identify given algebraic expression.

- A** incorrect description
- B** correct
- C** incorrect description
- D** incorrect description

- 24 A.FO.06.11:** Relate simple linear equations with integer coefficients, e.g.,  $3x = 8$  or  $x + 5 = 10$ , to particular contexts and solve.

Solve contextualized algebraic equation.

- A** correct
- B** incorrect factor - over by 1
- C** subtracted factor from product
- D** added factor to product



- 25 A.FO.06.12:** Understand that adding or subtracting the same number to both sides of an equation creates a new equation that has the same solution.

Identify equivalent equation.

- A** added variable to one side but subtracted from the other
- B** added constant to one side but subtracted from the other
- C** correct
- D** added constant to one side but subtracted from the other

- 26 A.FO.06.05:** Use standard conventions for writing algebraic expressions, e.g.,  $2x + 1$  means “two times  $x$ , plus 1” and  $2(x + 1)$  means “two times the quantity  $(x + 1)$ ”.

Translate words into expression.

- A**  $a + bx$  means  $a(b) + x$
- B**  $a + bx$  means  $ax + b$
- C** correct
- D**  $a + bx$  means  $a + b + x$

- 27 A.FO.06.07:** Simplify expressions of the first degree by combining like terms, and evaluate using specific values.

Evaluate algebraic expression given value of variable.

- A** value of variable
- B** value of coefficient after adding variables
- C** value of coefficient after adding variables + value of variable
- D** correct

- 28 A.FO.06.14:** Solve equations of the form  $ax + b = c$ , e.g.,  $3x + 8 = 15$  by hand for positive integer coefficients less than 20, use calculators otherwise, and interpret the results.

$$ax + b = c$$

- A** correct
- B**  $a + b$
- C**  $c - b$
- D**  $b + c$

- 29 A.FO.06.05:** Use standard conventions for writing algebraic expressions, e.g.,  $2x + 1$  means “two times  $x$ , plus 1” and  $2(x + 1)$  means “two times the quantity  $(x + 1)$ ”.

Translate text into algebraic expression.

- A** correct
- B**  $x/a + b = a(x + b)$
- C**  $x/a + b = ax + b$
- D**  $x/a + b = (x + b)/a$

- 30 A.FO.06.11:** Relate simple linear equations with integer coefficients, e.g.,  $3x = 8$  or  $x + 5 = 10$ , to particular contexts and solve.

Translate text into an algebraic equation.

- A** correct
- B**  $ax = b$  equals  $x = b - a$
- C**  $ax = b$  equals  $x - b = a$
- D**  $ax = b$  equals  $bx = a$

- 31 A.FO.06.11:** Relate simple linear equations with integer coefficients, e.g.,  $3x = 8$  or  $x + 5 = 10$ , to particular contexts and solve.

Solve contextualized algebraic equation.

- A** correct
- B** subtracted factor from product
- C** added factor to product
- D** twice given product

- 32 A.FO.06.04:** Distinguish between an algebraic expression and an equation.

Identify algebraic equation.

- A** algebraic expression
- B** algebraic inequality
- C** algebraic expression
- D** correct

- 33 A.FO.06.06:** Represent information given in words using algebraic expressions and equations.

Translate text into algebraic expression.

- A** subtracted instead of multiplied
- B** added instead of multiplied
- C** put variable with constant
- D** correct

- 34 A.FO.06.13:** Understand that multiplying or dividing both sides of an equation by the same non-zero number creates a new equation that has the same solution.

Identify equation with same solution as given equation.

- A**  $x/a = b$  has the same solution as  $(x/a) \times a = b/a$
- B**  $x/a = b$  has the same solution as  $(x/a) \times b = b/b$
- C** correct
- D**  $x/a = b$  has the same solution as  $(x/a)/a = b \times a$

- 35 A.RP.06.08:** Understand that graphs and tables can suggest relationships between quantities.

Interpret pictograph to determine pattern.

- A** less than correct total
- B** less than correct total
- C** correct
- D** greater than correct total

- 36 M.PS.06.02:** Draw patterns (of faces) for a cube and rectangular prism that, when cut, will cover the solid exactly (nets).

Identify the net for a rectangular prism.

- A** correct
- B** incorrect net
- C** incorrect net
- D** incorrect net

- 37 A.FO.06.14:** Solve equations of the form  $ax + b = c$ , e.g.,  $3x + 8 = 15$  by hand for positive integer coefficients less than 20, use calculators otherwise, and interpret the results.

Solve an equation in the form  $ax + b = c$ .

- A** divided  $ax$  and  $c$  by  $a$ , but not  $b$
- B** correct
- C** added  $b$  to  $c$
- D** subtracted  $b$  from both sides, but multiplied by  $a$

- 38 A.FO.06.06:** Represent information given in words using algebraic expressions and equations.

Translate text into an algebraic expression.

- A**  $an - b = b - an$
- B** correct
- C**  $an - b = bn - a$
- D**  $an - b = a - bn$

- 39 A.PA.06.01:** Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in  $3\frac{1}{2}$  hours?

Calculate speed in miles per hour given distance and time.

- A** correct
- B** did not include the decimal portion of the hours
- C** subtracted time from distance
- D** added time to distance

- 40 A.PA.06.01:** Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in  $3\frac{1}{2}$  hours?

Determine total number of books read given rate.

- A** total number of weeks divided by product of numbers in given rate
- B** total number of weeks - number of weeks given in rate
- C** total number of weeks
- D** correct

- 41 A.PA.06.09:** Solve problems involving linear functions whose input values are integers; write the equation; graph the resulting ordered pairs of integers, e.g., given  $c$  chairs, the "leg function" is  $4c$ ; if you have 5 chairs, how many legs?: if you have 12 legs, how many chairs?

Translate text into linear equation.

- A** correct
- B**  $y = ax$  is equal to  $y = a + x$
- C**  $y = ax$  is equal to  $x = ay$
- D**  $y = ax$  is equal to  $y = x - a$

- 42 A.PA.06.09:** Solve problems involving linear functions whose input values are integers; write the equation; graph the resulting ordered pairs of integers, e.g., given  $c$  chairs, the "leg function" is  $4c$ ; if you have 5 chairs, how many legs?: if you have 12 legs, how many chairs?

Use equation to find greatest number of gummy treats that can be purchased.

- A** correct
- B** total spent - cost per gummy bear
- C** total spent - cost per gummy bear - 1
- D** greatest value of options

- 43 A.RP.06.10:** Represent simple relationships between quantities, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches; use verbal descriptions, formulas or equations, tables, and graphs.

Match equation to the given table.

- A** correct
- B** graph of  $d = mt$  equals  $t = md$
- C** graph of  $d = mt$  equals  $d = m + t$
- D** graph of  $d = mt$  equals  $t = m + d$

- 44 A.RP.06.08:** Understand that graphs and tables can suggest relationships between quantities.

Match equation to given table.

- A** graph of  $y = mx$  equals  $x = my$
- B** correct
- C** graph of  $y = mx$  equals  $x + y = m$
- D** graph of  $y = mx$  equals  $xy = m$

- 45 A.RP.06.10:** Represent simple relationships between quantities, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches; use verbal descriptions, formulas or equations, tables, and graphs.

Identify table that shows given relationship between units of measure.

- A**  $x = my$  instead of  $y = mx$
- B**  $y = x + 3$  instead of  $y = mx$
- C**  $x = my$  instead of  $y = mx$  (with 2 different values than in option A)
- D** correct

- 46 N.MR.06.03:** Solve for the unknown in equations such as:  $1/4$  divided by box = 1,  $3/4$  divided by box =  $1/4$ , and  $1/2 = 1$  times box.

Identify equation equivalent to division equation.

- A**  $a/b \div c/d = a/b \times c/d$
- B** correct
- C**  $a/b \div c/d = b/a \times c/d$
- D**  $a/b \div c/d = b/a \times d/c$

- 47 N.ME.06.11:** Find equivalent ratios by scaling up or scaling down.

Determine equivalent fraction.

- A**  $a/b = 2a/3b$
- B** correct
- C**  $a/b = (a + 1)/(b + 1)$
- D** reciprocal

- 48 M.TE.06.03:** Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.

Calculate the volume of a cube given formula.

- A**  $3 \times \text{side length}$
- B**  $6 \times \text{side length}$
- C** surface area
- D** correct

- 49 M.UN.06.01:** Convert between basic units of measurement within a single measurement system, e.g., square inches to square feet.

Convert ounces to pounds.

- A** correct
- B** 1 pound = 10 ounces
- C** number of ounces - 16
- D**  $16 \times \text{number of ounces}$

- 50 M.UN.06.01:** Convert between basic units of measurement within a single measurement system, e.g., square inches to square feet.

Convert seconds to minutes.

- A** correct
- B** 1 minute = 10 seconds
- C** subtracted 60 from number of minutes
- D** added 60 to number of minutes

- 51 N.FL.06.14:** For applied situations, estimate the answers to calculations involving operations with rational numbers.

Estimate calculations with mixed numbers.

- A** underestimate
- B** underestimate
- C** underestimate
- D** correct

- 52 N.FL.06.15:** Solve applied problems that use the four operations with appropriate decimal numbers.

Multiply and add money to find cost of several books and one movie.

- A** total cost of several movies and 1 book
- B** correct
- C** total cost of the books
- D** total cost of several books minus cost of movie

- 53 N.FL.06.15:** Solve applied problems that use the four operations with appropriate decimal numbers.

Calculate distance driven over several days.

- A**  $a0b.c = abc$
- B** transposed ones and tens place
- C** correct
- D** rounded down to nearest hundred

- 54 A.FO.06.06:** Represent information given in words using algebraic expressions and equations.

Translate words into algebraic expression.

- A**  $ax - b = b - ax$
- B**  $ax - b = a - bx$
- C**  $ax - b = bx - a$
- D** correct

- 55 N.FL.06.15:** Solve applied problems that use the four operations with appropriate decimal numbers.

Calculate total cost of ice cream cones.

- A** less than cost of one cone (not  $\frac{1}{4}$  of cost)
- B** cost of one cone + number of cones
- C** number of cones  $\times$  dollar portion of cost of one cone plus cents portion
- D** correct

- 56 A.FO.06.06:** Represent information given in words using algebraic expressions and equations.

Identify equation that represents time needed to save for a computer.

- A** expression, part of correct equation
- B** correct
- C** addition expression
- D** added instead of multiplied

- 57 N.ME.06.05:** Order rational numbers and place them on the number line.

Order four rational numbers from least to greatest.

- A** mixed order - numerators least to greatest
- B** mixed order - denominators least to greatest
- C** correct
- D** greatest to least

- 58 N.ME.06.11:** Find equivalent ratios by scaling up or scaling down.

Calculate actual distance given the scale of a map.

- A** added distance in scale to distance on map
- B** multiplied scale by whole number portion of distance on map then added fractional portion of distance on map
- C** correct
- D** rounded up distance on map, then multiplied by scale

- 59 N.ME.06.11:** Find equivalent ratios by scaling up or scaling down.

Calculate ratio that is not equivalent to given ratio.

- A** equivalent ratio
- B** correct
- C** equivalent ratio
- D** equivalent ratio

- 60 M.TE.06.03:** Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.

Determine volume of rectangular prism.

- A** length + width + height
- B** half of volume
- C** correct
- D** surface area



- 61 N.MR.06.13:** Solve contextual problems involving percentages such as sales taxes and tips.

Calculate percentage of correctly answered questions.

- A** a.b% instead of ab%
- B** complement
- C** given percentage
- D** correct

- 62 A.RP.06.10:** Represent simple relationships between quantities, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches; use verbal descriptions, formulas or equations, tables, and graphs.

Identify relationship between measurements represented by line graph.

- A** measurements not represented in graph
- B** measurements not represented in graph
- C** correct
- D** measurements not represented in graph





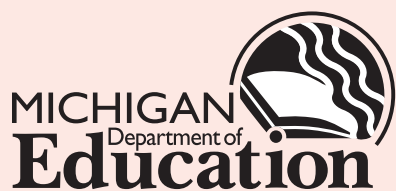
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